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STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TELECOPIER DATA
TRANSMITTAL SHEET

DOCUMENT SENT TO: Nigel Robinson

SENDING ADDRESS: USEPA Region II

DATE: Sept 1, 1987 NUMBER OF PAGES: 11

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MESSAGE: Please Call to Confirm receipt of Document

ASB 001 0794

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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31 AUG

U.S. EPA, Region II
N.J. Investigation and Compliance Section
26 Federal Plaza
New York, New York

Attention: Mr. Nigel Robinson, Project Officer

Gentlemen:

RE: Millington Asbestos Remedial Investigation
Report Draft May 29, 1987

The NJDEP (Department) has reviewed the draft Remedial Investigation Report, Asbestos Disposal Sites, Morris County, New Jersey prepared for National Gypsum Company, Dallas, Texas by Fred C. Hart Associates Inc. and submitted May 29, 1987.

Generally the Department found the report very thorough and comprehensive in developing the stated purpose of the RI, as to determine the presence and extent of asbestos and other contaminants at the sites investigated.

Because of the detail in this report, each section should be preceded by an executive summary that allows the reader to become familiar with salient points that answer the purpose of the investigation and arrive at the consultant's conclusions. The text is too voluminous to be reviewed properly and assimilated within standard review period.

Specific Comments:

1. The difference between the two asbestos standards in water should be discussed. When is the asbestos standard of 7.1 million fibers/liter (PMCLG) appropriate and when is 30,000 fibers/liter (AWQC) applicable; explain the connection between the latter standard and the conclusion that the direct contact pathway is only a potential hazard in the surface water.

2. Also, the report should discuss (recognize) the impacts of the various contaminants that were identified on the ecosystem of the Great Swamps.

3. It does not appear that sufficient field blanks were taken to meet NJDEP requirements; however, without complete chain-of-custody records this determination cannot be sure.

4. Page 3-16 Table 3-7 - The Department feels the common ranges for the elements given are too broad. The maximum values should be the N.J. cleanup levels or the USEPA average range. (Also, how were the average range values (Table 3-7) calculated, since they are obviously not the medians of the values shown?).

5. Page 3-20 Table 3-8 - Values for beryllium, cadmium, mercury and silver are beyond the Department's cleanup levels. (Also, dates for blanks page 3-20, -21 should be August 27, 1986).

6. Page 3-21 Table 3-9 - Exposure and risk assessments should be done for the pesticides Dieldrin, 4-4'-DDT and Endosulfan Sulfate since, under proper soil conditions and water chemistry, they can leach into ground water in excess of NJGWQC, N.J.A.C. 7:9-6.

7. Page 6-28 6.2.4.2 Soil - NJDEP has ARARs for direct contact with soils. See enclosed. The applicable level should be within the USEPA or NJDEP cleanup objective whichever is more stringent. (Also enclosed find NJDEP's Division Order No. 64 for ground water comparisons).

8. In the following incidences, the NJDEP cleanup levels are exceeded:

Page 3-23 Table 3-10	Cd, Hg
Page 3-29 Table 3-13	Cr, Hg, Ni
Page 3-67 Table 3-21	VOC, Hg
Page 3-92,93 Table 3-31	B/N in samples 7, 10 and 12
Page 3-94 Table 3-33	Pb

9. The Department does not recognize Preliminary Protective Concentration Limits as groundwater standards. The Department's groundwater quality standards are available in N.J.A.C. 7:9-6.

10. Page 6-122, Paragraph 6.6.1 Air - Air borne asbestos fibers may become a significant hazard at the White Bridge Road site during dusty periods, i.e., horseback riding, to both humans and animals.

11. Page 7-2, Paragraph 7-4 - The VOCs in potable wells PW-2 and PW-8 appear to be in excess of the Department's interim action levels. Please forward to the Department copies of the cited Appendices B and J (not included in report) and all potable well data in order that a potential problem at these wells can be examined.

If you have any questions regarding these comments contact me at (609) 633-0701.

Yours truly,

E. G. Kaup

Edgar G. Kaup, P.E.
Case Manager

kaw
Enclosures
c: D. Hart
S. Byrnes
P. Devlin

STATE OF NEW JERSEY STANDARDS AND CRITERIA

Ground Water Cleanup Criteria

The State of New Jersey publish ‡ in October 1986 the Division Order No. 64, which describes the Department's "revised policy for determining ground water corrective action criteria for Volatile Organic Toxic Pollutants" (VOs). Such criteria are applicable to all ground water corrective actions, regardless of the regulatory program (NJPDES, RCRA, ECRA, Superfund, Enforcement, etc.) and the order allows the Division of Water Resources the authority to provide exemptions to the criteria where appropriate.

Under the order, Volatile Organic Toxic Pollutants as defined in N.J.A.C. 7:14A-1.1 et seq., Appendix B, are divided into classes (A) carcinogens and (B) non-carcinogens based upon current scientific consensus. Table 2 illustrates NJDEP Groups A, B-1, and B-2 VOs:

Table 2

NJDEP Group A	NJDEP Group B-1
acrylonitrile	acrolein
benzene	bromoform
carbon tetrachloride	chlorobenzene
chloroform	chlorodibromomethane
1,2-dichloroethane	chloroethane
1,1-dichloroethylene	2-chloroethylvinyl ether
methylene chloride	dichlorobromomethane
1,1,2,2-tetrachloroethane	1,1-dichloroethane
tetrachloroethylene	1,2-dichloropropane
trichloroethylene	1,3-dichloropropylene
vinyl chloride	ethylbenzene
1,1,2-trichloroethane	methyl bromide
di (2-ethylhexyl) phthalate **	methyl chloride
	toluene
	1,2-trans-dichloroethylene
	diethyl phthalate **
	di-n-buthyl phthalate **

NJDEP Group B-2	MCL* (PPB)
1,1,1-trichloroethane	200

*EPA Proposed

**: Di(2-ethylhexyl)phthalate [also known as bis(2-ethylhexyl)phthalate and DEHP] listed in Table 2 under NJDEP Group A and diethyl phthalate and di-n-butyl phthalate (dibutyl phthalate) listed in Table 2 under NJDEP Group B-1, are not part of the chemicals regulated by the Division Order No.64 of October 1986, which describes the Department's revised policy for determining ground water corrective action criteria for Volatile Organic Toxic Pollutants (VOs). These phthalates were added to the VOs listed in Table 2 as "recommended interim corrective action criteria for phthalic acid esters commonly found in ground water". The recommendation was included in a Memorandum from the Bureau of Ground Water Quality Management dated April 17,1986. Recommendations are based on a toxicological and carcinogenic evaluation by Dr. Shing-Fu Hsueh's unit, assuming treatability and detection limits for these phthalates are comparable to those for VOs.

The ambient concentration of any individual compound in NJ DEP Group A shall not exceed 5 parts per billion in ground water. In addition, the ambient concentration of the sum of all compounds listed in NJ DEP Groups A and B-1 shall not exceed 50 parts per billion in ground water and any compound in the NJ DEP Group B-2 shall not exceed it's MCL in ground water.

Drinking Water Interim Action Levels

The New Jersey Safe Drinking Water Act of 1977 requires the Department to establish MCLs for hazardous contaminants found in New Jersey's drinking water in addition of conducting initial and periodic testing for hazardous contaminants. Under the revised Safe Drinking Water Act (A-280), the Department has been obtaining analyses of volatile organic pollutants in public water supplies for almost a year. Pending the establishment of final maximum contaminant levels (MCLs) by either Federal EPA or New Jersey's Drinking Water Quality Institute, the Department has developed Drinking Water Guidance levels for fourteen organic compounds (see Table 3). The New Jersey's Drinking Water Quality Institute currently is planning to publish, in the New Jersey Register, recommended MCLs for sixteen (plus organics) organic compounds to request public comments (see section below). The Drinking Water Guidance should serve only as guidance for potable water problems and not for general application in determining acceptable levels in other environmental media.

The Drinking Water Guidance levels established by the Department and published in January 1986, consist of four Interim Action Levels (IALs) based on the concentration in drinking water samples of each of the specified hazardous contaminant included in Table 3. The ranges of concentrations established in Level I through IV are health based numbers. The development of the IALs by the Department's Office of Science and Research was based on existing published guidelines and studies. A significant portion of the IALs in Table 3 derives directly from US EPA's Health Advisories and RMCLs.

The hazardous contaminants have been grouped according to a Departmental carcinogenicity evaluation as either Group A, B or C.. Each group represents a Departmental categorization based upon the weight of evidence of carcinogenicity for each hazardous contaminant listed. Group A refers to known or probable human carcinogens, Group B refers to possible human carcinogens, and Group C refers to insufficient or negative data available on carcinogenicity.

IALs for Group A chemicals were derived from quantitative risk assessments based upon available human and animal carcinogenicity studies. The maximum concentration in Level I for Group A is the level that would result in cancer in no more than one in one million persons ingesting that chemical for a lifetime. This maximum concentration in level IV for Group A utilizes a one in ten thousand risk assessment based on a lifetime exposure.

ATTACHMENT ONE.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

SUMMARY OF APPROACHES TO SOIL CLEANUP LEVELS

(I) DISCUSSION OF POSSIBLE APPROACHES

NJDEP has investigated many possible approaches to establishing cleanup objectives for contaminated soil including cleanup to background, cleanup to the analytical detection limits and cleanup to a risk assessment derived number. The Department has also developed a cleanup objective based on chemical class i.e. petroleum hydrocarbons, base neutrals, etc.

(A) Cleanup to Background has been considered for a number of compounds. Development of a cleanup objective based on background requires an extensive environmental data base. This approach can only be applied to compounds which are normally found in nature. If it is applied to anthropogenic compounds the cleanup level could become "zero", which if applied would actually be the current limit of detection of the analytical method in use. A cleanup objective based on background is determined by the range of concentrations observed on a specific site or based on literature values. This approach has been used to develop cleanup objectives for inorganic compounds. It also has been used for petroleum hydrocarbons, where an "industrial" background is generalized as 100 ppm.

(B) Cleanup levels based on analytical detection limits have been considered. In reality, the cleanup objective becomes the limit of detection of the analytical method, thus the cleanup objective becomes non-detectable. This approach is undesirable because the limit of detection of analytical methods is a moving target. Current trends in environmental analytical chemistry indicate that detection limits will continue to decrease to levels that are likely to be below those of environmental or public health concern. This approach is further complicated by the fact that in many instances the method detection limit is influenced by the nature of the soil and the presence of other interfering compounds.

Developing a cleanup objective based on method detection limits should only be applied to anthropogenic compounds. If applied to compounds which occur naturally, this cleanup objective could be well below the levels normally found in uncontaminated environments.

(C) Risk assessment methodology has been considered to establish cleanup objectives for contaminated soil. The use of risk assessment has been used by regulatory agencies to establish standards and/or criteria for drinking water and surface waters. A distinction is made between carcinogens and noncarcinogens. In the case of carcinogens, it is assumed that no threshold exists below which cancer does not develop. Thus, exposure to any dose regardless of how small, results in a

cancer risk. For noncarcinogens, on the other hand, a threshold exists below which no response is observed. Thus a "safe" dose exists. The numbers developed for risk based standards/criteria can range from sub parts per billion to hundreds of parts per million.

The use of the risk assessment to develop cleanup criteria for contaminated soil requires that 1) an exposure pathway be defined in terms of the frequency and duration of exposure and 2) that a suitable toxicology database exists for the chemical of concern. In the absence of either of these, the risk assessment approach cannot be applied correctly. Where there is uncertainty regarding the route or extent of exposure, the risk assessment should reflect these uncertainties.

In general, conservative worst case exposure scenarios are used in developing risk based standards or criteria. Unfortunately, real life exposures may be quite different than those used to develop the risk based number. Thus a risk based number may "overprotect" the individuals being exposed. This can be avoided by developing a situation specific risk based cleanup criterion or by developing a range of exposure scenarios which can be selectively applied to specific situations. The most conservative approach (and the least time consuming) is to use reasonable worst case exposure scenarios to protect the most sensitive individual likely to be exposed.

(D) Chemical class cleanup objectives have been considered for classes of compounds. Cleanup objectives which have been established for a class of compounds are used as a surrogate or action level to indicate if a closer look at the individual chemicals comprising the residue is warranted.

(II) APPLICATION OF CLEANUP OBJECTIVES IN NJDEP PROGRAMS

Soil cleanup objectives have been developed for individual compounds or compound classes based on anticipated background or risk assessment. In general, the Department attempts to establish a soil cleanup level that:

- protects human health from direct contact
- protects ground water quality from degradation due to leaching
- protects surface water quality (in situations when transport of contaminated soil to surface water is a possibility)
- addresses air impacts when appropriate.

(A) Inorganic compounds - Cleanup objectives for metals have been established based on expected background concentrations in New Jersey soils. The cleanup objectives are generally 1 to 3 times background depending on the range of concentrations observed, toxicity, and mobility. Table 1 summarizes New Jersey background, United States background and soil cleanup objectives. The cleanup objectives applied at a specific site may be different than those listed in Table 1 depending on site specific factors. These exceptions normally allow higher levels to remain on site. These situations include: (1)

availability of information which indicates soil background onsite is different than values listed in Table 1, (2) repeated contamination is inevitable (especially pertaining to lead near highways), (3) a contamination problem is area-wide, and (4) the contamination is addressed in the cleanup plan (i.e. encapsulation).

(B) Organic contaminants - Cleanup objectives for individual organic compounds have been developed based on risk assessment methodologies. A worst case soil ingestion model has been used to calculate an acceptable soil contaminant level (ASCL) to protect individuals from direct contact (Attachment 1). The ASCL is then compared to analytical method detection limits to determine if the calculated concentration can be measured accurately. If the risk based criterion is below the method detection limit, the method detection limit becomes the cleanup objective.

The Department is currently reviewing models for transport through the unsaturated zone to identify those which would be suitable to calculate the concentration of a chemical that could remain in the soil column and protect ground water quality if leaching were to occur. In the interim, acceptable soil contaminant levels to protect ground water quality are based on scientific judgement. The chemical and physical properties of the contaminant(s), soil characteristics, hydrogeology and nature of the aquifer are considered.

Risk Assessment has been used by the New Jersey Division of Hazardous Site Mitigation (DHSM) to develop an acceptable soil contaminant level for PCBs based on direct contact. (Transport to ground water was considered insignificant since PCBs bind strongly to soils.) A risk assessment utilizing a worst case lifetime soil ingestion scenario indicated the individual could be exposed to soil contaminated with 274 ppb of PCBs without exceeding a one-in-a-million lifetime cancer risk due to the exposure. The limit of detection of PCBs in soil using current analytical methods is 3.3 ppm. In reality 5 ppm or above can be detected with confidence. Thus the acceptable soil contaminant level (based on analytical methods) is 5 ppm. In situations where the potential for children to come in contact with soils is high (i.e., parks, schoolyards, day-care centers, residential areas), 5 ppm is not adequate to protect health, and a cleanup objective of 1 ppm should be considered in spite of the inherent uncertainty with regard to quantification.

This risk assessment approach is summarized in a concept paper entitled Calculation of Cleanup Levels for Contaminated Soils, recently prepared by DHSM. The approach outlined in the document is composed to two steps: (A) selection of chemicals of concern and (B) calculation of acceptable soil contaminant levels to protect individuals from direct contact and to protect ground water and surface water quality. This approach has been used to rank and calculate acceptable soil contaminant levels for 21 compounds which include PCBs, chlorinated solvents, nonchlorinated solvents, phenols, polycyclicaromatic hydrocarbons, and phthalates. The approach was

developed in-house and has not gone through an external peer review. Many of the equations presented in the paper are not currently used to develop acceptable soil cleanup levels but are used to identify environmental concerns and assist in decision making. The document will undergo a critical review before it is used freely. DHSH is finalizing a request for proposal to hire a consultant to review, critique, and refine the approach developed by DHSH.

(C) ~~Soil cleanup~~ action levels have been developed for volatile organics, base neutral extractables, and petroleum hydrocarbons as shown below.

Volatile Organics	1 ppm
Base Neutrals	10 ppm
Petroleum Hydrocarbons	100 ppm

These ~~numbers~~ action levels are usually conservatively set to ~~serve as an indicator or "red flag"~~ to point out the need for further attention. This approach allows staff not trained in toxicology to determine when the assistance of toxicologist/environmental chemist is needed. In general, ~~these~~ levels are not cleanup numbers, but they could be in certain situations.

Chemical class cleanup objectives have been set for petroleum hydrocarbons at 100 ppm. (This was assumed to be "industrial background"). The actual soil cleanup number may vary depending on the chemical constituents present in the petroleum residue. Levels greater than 100 ppm may be acceptable if the residue is comprised mainly of nontoxic chemicals, while a level less than 100 ppm may be warranted if the residue is comprised mostly of benzene and/or the carcinogenic polynuclear aromatic hydrocarbons.

(III) SUMMARY

This attempts to summarize the Department's position on the development and application of soil cleanup criteria. The approach may be revised as exposure assessment and risk assessment methodologies develop. The New Jersey Department of Environmental Protection, Division of Hazardous Site Mitigation may be contacted for updated information.

April 1987

TABLE 1

Metal	N.J. Background[a] (ppm)	U.S. Background (ppm)	NJDEP Cleanup Objective (ppm)	Time above NJ Background
Arsenic	N.A.	1.1 - 16.7	20	N.A.
Barium	N.A.	10 - 1,500 (290)[b]	400	N.A.
Beryllium	N.A.	<1 - 7 (0.55)[b]	1	N.A.
Cadmium	1 - 4	0.01 - 1	3	1
Chromium (total)	5 - 48	1 - 1,500	100	2
Copper	0.5 - 53.6	2 - 200	170	3
Lead	1 - 180	2 - 200	250 - 1000[d]	N.A.
Mercury	N.A.	0.01 - 4.6	1	N.A.
Nickel	11.1 - 86.5	8 - 550	100	1
Selenium	0.01 - 4[c]	0.01 - 5	4	1
Silver	N.A.	0.01 - 5	5	N.A.
Zinc	4.5 - 168	10 - 3000	350	2

a. Data from Stephen Toth or Harry Motto, Cook College, Rutgers University

b. Background in Eastern United States only. Numbers in parentheses are the mean concentrations.

c. Agricultural soils in N.J.

d. The lead cleanup objective is not representative of background concentrations. It is based on a risk assessment that has been completed by N.J. Department of Health.

ATTACHMENT I

Carcinogens

$$\text{ASCL} = \frac{(\text{acceptable cancer risk})}{(\text{carcinogenic potency})} \times \frac{1000 \text{ g/kg}}{(\text{lifetime average daily soil intake})}$$

acceptable cancer risk = 1×10^{-6}

1000 g/kg = Conversion factor

lifetime average daily soil intake = 0.0028 g/kg/day

ASCL = Acceptable soil contaminant level

Noncarcinogens

$$\text{ASCL} = \frac{\text{ADI (mg/day)} \times 1000 \text{ (g/kg)} \times \text{BW}}{\text{Soil Intake (g/day)}}$$

ADI = Acceptable daily intake

Soil intake = 2.5 g/day

BW = body weight adjustment factor